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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/578,282	05/25/2000	Jody E. Beecher	03848-00001	7769

28315 7590 04/17/2003

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EXAMINER

EPPERSON, JON D

ART UNIT	PAPER NUMBER
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1639

DATE MAILED: 04/17/2003

19

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary*File Copy*

Application No.

09/578,282

Applicant(s)

BEECHER ET AL.

Examiner

Jon D Epperson

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Januray 21, 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3, 6, 12, 14, 15, 52-60 and 70-76 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 6, 12, 14, 15, 52-60 and 70-76 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

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DETAILED ACTION

Please note: The Group and/or Art Unit location of your application in the PTO has changed. To aid in correlating any papers for this application, all further correspondence regarding this application should be directed to Group Art Unit 1639.

Status of the Application

1. The Response filed January 21, 2003 (Paper No. 18) is acknowledged.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Status of the Claims

3. Claims 1-3, 6, 12, 14-15, 52-60 and 70-76 were pending in the application (see Paper No. 18, page 5, paragraph 1). Claims 1-3, 12, 14-15, 52-54, 58-60, 70-71 and 74 were amended and no claims were added or cancelled. Therefore, claims 1-3, 6, 12, 14-15, 52-60 and 70-76 are still pending and examined on the merits in this action.
4. This application contains claims 5, 11, 61-69 and 77-83 drawn to inventions nonelected. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144). See MPEP § 821.01.

Withdrawn Objections/Rejections

6. The objections to the specification and claims are withdrawn in view of applicant's amendments thereto. With respect to the rejections under the second paragraph of 35 U.S.C.

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112, the rejections denoted A-O are withdrawn in view of applicant's amendments to the claims and/or arguments. All other rejections are maintained and the arguments are addressed below.

Outstanding Objections and/or Rejections

35 USC 112, second paragraph

5. Claims 1-3, 6, 12, 14-15, 52-60 and 70-76 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

A-O. Withdrawn.

P. The term "masked acid" in claims 3 and 54 is not defined by the claim or the specification and is indefinite and/or unclear. What set of acids does the term "masked" include? Consequently, it is not possible to determine the metes and bounds of the invention as claimed. Therefore, claim 3 and all dependent claims are rejected under 35 U.S.C. 112, second paragraph.

Q. The phrase "forming a surface" in claims 1, 52 and 70 is not defined by the claim or the specification and is indefinite and/or unclear. What surface is being formed? The word surface denotes the "exterior face of an object." What "object" is being referred to? What is the exterior face? What is the interior face? Consequently, it is not possible to determine the metes and bounds of the invention as claimed. Therefore, claim 1, 52 and 70 and all dependent claims are rejected under 35 U.S.C. 112, second paragraph.

Response to Arguments

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22. Applicant's arguments have been fully considered but are not found persuasive. The examiner's rationale is set forth below.

For *claims 3 and 54* (paragraph P), applicants argue that "support for the phrase "masked acid" can be found at least on page 20, lines 28-31 of the application" wherein page 20, lines 28-31 of the application recite "In some preferred embodiments of polynucleotide synthesis, masked acids including ester, anhydrides, and nitrites are used as autocatalysts. In one preferred specific embodiment, the RAC is a PAAC which generates an acid upon exposure to radiation of suitable wavelength."

It is the examiner's position that the specification or claims do not define what a masked acid is (see rejection above). Simply providing an example of a masked acid would not allow a person of skill in the art to determine *a priori* all the possible compounds that would fall within this category. Conceivably, any compound could be a masked acid given an infinite number of chemical transformations. Therefore, the rejection is maintained for the reasons of record.

For *claims 1, 52 and 70* (paragraph Q), applicants argue that "the specification contains sufficient support for the phrase "forming a surface." Support can be found in Example II at page 29, lines 12-15. Specifically, "a poly(ethylene glycol) linker molecule containing a DMT protected hydroxyl group was covalently bound to a substrate. The surface of the substrate was then coated with polymer ..." It is clear from this example that "forming a surface" is implicitly occurring when the linker is being bound to the surface of the substrate. Additional support is found in Example III at page 31, lines 8-11 of the application. The relevant portion reads, "the coated substrate was prebaked at 85°C for 2 min, irradiated with varying doses at 365 nm, and postbaked at 85°C for 2 min. The polymer coating was the removed with an aectone wash and

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the surface treated with a fluorescent coupling reagent.” In this example, it is implicitly clear that a surface is being formed by the process of prebaking, irradiating, postbaking removing the polymer coating, and then treating with a fluorescent coupling agent.”

The Examiner’s position is that it is not implicitly clear what “forming a surface” entails. As stated in the outstanding rejection (see above), the word surface denotes the “exterior face of an object”, but no object has been denoted in applicants’ claims. In the first example outlined above (i.e., Example II at page 29, lines 12-15) applicants argue that “[i]t is clear from this example that “forming a surface” is implicitly occurring when the linker is being bound to the surface of the substrate” (see Paper No. 18, page 7, paragraph 4). The examiner contends that a surface is not being formed here, but rather that the properties of a pre-existing surface (i.e., the surface of the substrate) are only being modified (i.e., a poly(ethylene glycol) linker molecule containing a DMT protected hydroxyl group is being covalently attached “to the surface” of the substrate). In a similar fashion the Examiner contends that at best applicants’ claims only refer to method steps for modifying an existing surface because the object (i.e., the substrate) and any method steps for creating said object have not been specified and, as a result, it is not clear how these method steps would form a surface. Consequently it is not possible to determine what the object is? What the interior and exterior faces are and, more generally, what the metes and bound of the claimed invention are. Therefore, the rejection is maintained.

Claims Rejections - 35 U.S.C. 102

6. Claims 1-2, 6, 12, 15, 52, 53, 55, 56, 57, 70-73 are rejected under 35 U.S.C. 102(b) as being anticipated by Holmes, C. P. (US #5,242,974) (Filing Date is Nov. 22, 1991; Date of

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Patent is **Sep. 7, 1993**) and Holmes C.P. (US #5,679,773) (Filing Date is **Jan. 17, 1995**; Date of Patent is **Oct. 21, 1997**) wherein the '773 reference is provided for the sole purpose of showing the inherent properties of the NVOC group as outlined below in accordance with MPEP § 2131.01.

For *claim 1*, Holmes, C. P. (see entire document) teaches methods for the removal of protecting groups in solid-phase synthesis (see Holmes, C. P., column 4, lines 59-64) (A protecting group “may be selectively removed there from for exposure of a reactive group”), which reads on the preamble of claim 1. Furthermore, Holmes, C. P. teaches that the protecting group can be removed from a “synthetic intermediate” on a “surface” (see Holmes, C. P., column 2, lines 44-60) (Holmes states that protecting groups may be used in conjunction with resin bound intermediates to synthesize polymers using “intermediates” of shorter length) (see also Holmes, C. P., column 4, lines 48-50) (A substrate or support is defined as a material or group of materials having a rigid or semi-rigid “surface or surfaces”), which also reads on the preamble and part a) of claim 1. In addition, Holmes, C. P. discloses the “photolabile” NVOC protecting group (see Holmes, C. P., column 18, lines 43-54), which can act as a “radiation sensitive compound”, a “catalyst”, and an “autocatalytic compound”, which reads on parts i) and ii) of claim 1 (see Holmes, C. P. (US # 5,679,773), column 18, lines 43-54) (Holmes, C. P. i.e., the '773 patent discloses the inherent properties of the NVOC protecting group teaching that the NVOC can function as a radiation (light) sensitive compound, a catalyst (6,6-bisveratric acid catalyzes the formation of more 6,6-bisveratric acid), and an autocatalytic compound

(6,6-bisveratric acid catalyzes the removal of the NVOC protecting group)).

Furthermore, Holmes, C. P. teaches “light-directed, spatially-addressable techniques” for removing protecting groups (see Holmes, C. P., column 2 lines 32-32), which reads on claim 1 b) wherein the protecting group is removed by “irradiating at least a part of said surface.” Finally, Holmes, C. P. discloses removing the NVOC group with $h\nu$ and reacting the resulting functional group with synthetic monomer intermediates (see Holmes, C. P. i.e., the ‘974 patent, figure 5, outlining the reaction of NVOC with $h\nu$ and monomers).

For **claim 2**, Holmes, C. P. teaches a “photoremovable” NVOC protecting group (see Holmes, C. P., column 6, lines 21-22; column 18, lines 43-54), which reads on claim 2 wherein the radiation sensitive compound of claim 1 is a “photosensitive compound or group.”

For **claim 6**, Holmes, C. P. teaches synthesizing various types of polymers including “peptides” (see Holmes, C. P., column 9, lines 5) (“In a preferred embodiment for peptide synthesis, the protective group PG1 is removed with light”), which reads on claim 6 wherein “said synthesis intermediate is ... a polypeptide.”

For **claim 12**, Holmes, C. P. teaches a photolabile NVOC protecting group that is cleaved into an acid catalyst (6,6-bisveratric acid) by light (see Holmes, C. P., column 18, lines 43-54), which reads on claim 12 wherein “said photosensitive compound is ... a photoactivated acid catalyst.”

For **claim 15**, Holmes, C. P. teaches a photolabile NVOC protecting group that is cleaved into an acid catalyst (6,6-bisveratric acid) by light (see Holmes, C. P., column 18,

lines 43-54), which reads on claim 15 wherein “said photosensitive group and said autocatalytic group are parts of the same compound” i.e., they are both derived from the photolabile NVOC protecting groups.

For *claim 52*, Holmes, C. P. teaches methods for the removal of protecting groups in solid-phase synthesis (see Holmes, C. P., column 4, lines 59-64) (A protecting group “may be selectively removed there from for exposure of a reactive group”), which reads on the preamble of claim 52. Furthermore, Holmes, C. P. teaches that the protecting group can be removed from a “synthetic intermediate” on a “surface” (see Holmes, C. P., column 2, lines 44-60) (Holmes states that protecting groups may be used in conjunction with resin bound intermediates to synthesize polymers using “intermediates” of shorter length) (see also Holmes, C. P., column 4, lines 48-50) (A substrate or support is defined as a material or group of materials having a rigid or semi-rigid “surface or surfaces”), which also reads on the preamble and part a) of claim 52. In addition, Holmes, C. P. discloses the “photolabile” NVOC protecting group (see Holmes, C. P., column 18, lines 43-54), which can act as a “radiation sensitive compound”, a “catalyst”, and an “autocatalytic compound”, which reads on parts i) and ii) of claim 1 (see Holmes, C. P. (US # 5,679,773), column 18, lines 43-54) (Holmes, C. P. discloses the inherent properties of the NVOC protecting group teaching that the NVOC can function as a radiation (light) sensitive compound, a catalyst (6,6-bisveratric acid catalyzes the formation of more 6,6-bisveratric acid), and an autocatalytic compound (6,6-bisveratric acid catalyzes the removal of the NVOC protecting group)). Finally, Holmes, C. P. teaches “light-directed, spatially-addressable techniques” for removing protecting groups

(see Holmes, C. P., column 2 lines 32-32), which reads on claim 52 b) wherein the protecting group is removed by “irradiating at least a part of said surface.”

For **claim 53**, Holmes, C. P. teaches a “photoremovable” NVOC protecting group that is cleaved into an acid catalyst i.e., 6,6-bisveratric acid (see Holmes, C. P., column 6, lines 21-22; column 18, lines 43-54), which reads on claim 53 wherein “the photosensitive compound or group is a photoactivated acid catalyst.”

For **claim 55**, Holmes, C. P. teaches that the protecting group (PG) can be on a “tether” molecule (see column 2, line 55), which reads on claim 55 wherein the synthesis intermediate is a “linker” molecule.

For **claim 56**, Holmes, C. P. teaches synthesizing various types of polymers including “peptides” (see Holmes, C. P., column 9, lines 5) (“In a preferred embodiment for peptide synthesis, the protective group PG1 is removed with light”), which reads on claim 56 wherein “said synthesis intermediate is ... a polypeptide.”

For **claim 57**, Holmes, C. P. teaches an acid labile NVOC protecting group (see Holmes, C. P., column 18, lines 43-54), which reads on claim 57 wherein “the removable protecting group is an acid removable group.”

For **claim 70**, Holmes, C. P. teaches methods for the removal of protecting groups in solid-phase synthesis (see Holmes, C. P., column 4, lines 59-64) (A protecting group “may be selectively removed there from for exposure of a reactive group”), which reads on the preamble of claim 70. Furthermore, Holmes, C. P. teaches that the protecting group can be removed from a “synthetic intermediate” on a “surface” (see Holmes, C. P., column 2, lines 44-60) (Holmes states that protecting groups may be used in conjunction

with resin bound intermediates to synthesize polymers using “intermediates” of shorter length) (see also Holmes, C. P., column 4, lines 48-50) (A substrate or support is defined as a material or group of materials having a rigid or semi-rigid “surface or surfaces”), which also reads on the preamble and part a) of claim 70. In addition, Holmes, C. P. discloses the “photolabile” NVOC protecting group (see Holmes, C. P., column 18, lines 43-54), which can act as a “radiation sensitive compound”, a “catalyst”, and an “autocatalytic compound”, which reads on parts i) and ii) of claim 70 (see Holmes, C. P. (US # 5,679,773), column 18, lines 43-54) (Holmes, C. P. discloses the inherent properties of the NVOC protecting group teaching that the NVOC can function as a radiation (light) sensitive compound, a catalyst (6,6-bisveratric acid catalyzes the formation of more 6,6-bisveratric acid), and an autocatalytic compound (6,6-bisveratric acid catalyzes the removal of the NVOC protecting group)). Finally, Holmes, C. P. teaches “light-directed, spatially-addressable techniques” for removing protecting groups (see Holmes, C. P., column 2 lines 32-32), which reads on claim 70 b) wherein the protecting group is removed by “irradiating at least a part of the surface.”

For **claim 71**, Holmes, C. P. teaches a “photoremovable” NVOC protecting group that is cleaved into an acid catalyst i.e., 6,6-bisveratric acid (see Holmes, C. P., column 6, lines 21-22; column 18, lines 43-54), which reads on claim 71 wherein “the photosensitive compound or group is a photoactivated acid catalyst.”

For **claim 72**, Holmes, C. P. teaches that the protecting group (PG) can be on a “tether” molecule (see column 2, line 55), which reads on claim 55 wherein the synthesis intermediate is a “linker” molecule.

For **claim 73**, Holmes, C. P. teaches synthesizing various types of polymers including “peptides” (see Holmes, C. P., column 9, lines 5) (“In a preferred embodiment for peptide synthesis, the protective group PG1 is removed with light”), which reads on claim 73 wherein “said synthesis intermediate is ... a polypeptide.”

7. Claims 1-2, 6, 12, 15, 52, 53, 55, 57, 60, 70-72, 76 are rejected under 35 U.S.C. 102(b) as being anticipated by MacDonald et al (MacDonald, S. A.; Willson, C. G.; Frechet, J. M. “Chemical Amplification in High-Resolution Imaging Systems” ACC. Chem. Res. **1994**, 27(6):151-158.

For **claim 1**, MacDonald et al teaches the removal of the t-BOC protecting groups (see MacDonald et al, page 152, column 2, last paragraph), which reads on the preamble of claim 1 wherein a protective group is “removed” from a synthetic intermediate. Furthermore, MacDonald et al teaches that the protecting group can be removed from a “synthetic intermediate” on a “surface” (see MacDonald et al, page 152, column 2, last paragraph; page 153, column 1, figure 2) (disclosing a poly[4-(tert-butoxycarbonyl) polycarbonate-oxy]styrene layer, which is a “synthesis intermediate” having a protecting t-BOC group, and a lithographic surface for making a semiconductor device), which also reads on the preamble and part a) of claim 1. In addition, MacDonald et al discloses triphenylsulfonium hexafluoroantimonate (acts as a radiation sensitive compound) to generate in the presence of light trifluoromethane sulfonic acid (acts as a catalyst) which can cleave the t-BOC protecting group and can also cleave more triphenylsulfonium

hexfluoroantimonate (acts as an autocatalytic compound) i.e., triphenylsulfonium hexfluoroantimonate functions as both a radiation sensitive compound and an autocatalytic compound (see MacDonald et al, page 152, last paragraph to page 153, first column), which reads on parts i) and ii) of claim 1. Furthermore, MacDonald et al teaches “light-directed, spatially-addressable techniques” for removing protecting groups (see MacDonald et al, page 153, figure 2) (showing the use of a mask to direct the light catalyzed hydrolysis of the t-BOC). Finally, MacDonald discloses that the phenol produced by the acid-catalyzed decomposition of *tert*-butyl carbonate can be reacted with other compounds (e.g., $\text{Me}_2\text{N-SiMe}_3$ to produce poly-SiMe₃), which anticipates applicants’ newly amended claim (see MacDonald et al, page 157, figure 11).

For **claim 2**, MacDonald et al teaches triphenylsulfonium hexfluoroantimonate as a light sensitive compound that generates an acid catalyst upon exposure to light (see MacDonald et al, page 152, last paragraph), which reads on claim 2 wherein the radiation sensitive compound of claim 1 is a “photosensitive compound or group.”

For **claim 6**, MacDonald et al teaches synthesizing various types of polymers including “peptides” (see MacDonald et al, page 152, last paragraph), which reads on claim 6 wherein “said synthesis intermediate is ... a polypeptide.”

For **claim 12**, MacDonald et al teaches triphenylsulfonium hexafluoroantimonate that is converted via light to trifluoromethane sulfonic acid, which reads on claim 12 wherein “said photosensitive compound is ... a photoactivated acid catalyst.”

For **claim 15**, MacDonald et al teaches triphenylsulfonium hexafluoroantimonate (acts as a radiation sensitive compound) to generate in the presence of light

trifluoromethane sulfonic acid (acts as a catalyst) which can cleave the t-BOC protecting group and can also cleave more triphenylsulfonium hexfluoroantimonate (acts as an autocatalytic compound) i.e., triphenylsulfonium hexfluoroantimonate functions as both a radiation sensitive compound **and** an autocatalytic compound (see MacDonald et al, page 152, last paragraph to page 153, first column), which reads on claim 15 wherein “said photosensitive group and said autocatalytic group are parts of the same compound.”

For *claim 52*, MacDonald et al teaches the removal of the t-BOC protecting groups (see MacDonald et al, page 152, column 2, last paragraph), which reads on the preamble of claim 52 wherein a protective group is “removed” from a synthetic intermediate. Furthermore, MacDonald et al teaches that the protecting group can be removed from a “synthetic intermediate” on a “surface” (see MacDonald et al, page 152, column 2, last paragraph; page 153, column 1, figure 2) (disclosing a poly[4-(terbutoxycarbonyl) poly-carbonate-oxy]styrene layer, which is a “synthesis intermediate” having a protecting t-BOC group, and a lithographic surface for making a semiconductor device), which also reads on the preamble and part a) of claim 52. In addition, MacDonald et al discloses triphenylsulfonium hexafluoroantimonate (acts as a radiation sensitive compound) to generate in the presence of light trifluoromethane sulfonic acid (acts as a catalyst) which can cleave the t-BOC protecting group and can also cleave more triphenylsulfonium hexfluoroantimonate (acts as an autocatalytic compound) i.e., triphenylsulfonium hexfluoroantimonate functions as both a radiation sensitive compound **and** an autocatalytic compound (see MacDonald et al, page 152, last paragraph to page 153, first column), which reads on parts i) and ii) of claim 52. Finally,

MacDonald et al teaches “light-directed, spatially-addressable techniques” for removing protecting groups (see MacDonald et al, page 153, figure 2) (showing the use of a mask to direct the light catalyzed hydrolysis of the t-BOC).

For *claim 53*, MacDonald et al teaches triphenylsulfonium hexafluoroantimonate that is converted via light to trifluoromethane sulfonic acid (see MacDonald et al, page 152 second column), which reads on claim 53 wherein “said photosensitive compound is ... a photoactivated acid catalyst.”

For *claim 55*, MacDonald et al teaches a poly[4-(terbutoxycarbonyl) poly-carbonate-oxy]styrene which possesses a “phenol linker” to the backbone (see MacDonald et al, Figure 3), which reads on claim 55 wherein the synthesis intermediate is a “linker” molecule.

For *claim 57*, MacDonald et al teaches the t-BOC protecting group that can be hydrolyzed in acid (see MacDonald et al, page 152, second column), which reads on claim 57 wherein “the removable protecting group is an acid removable group.”

For *claim 60*, MacDonald et al teaches the t-BOC protecting group (see MacDonald et al, page 152, second column), which reads on claim 60 wherein “the protecting group is selected from ... tert-butyloxycarbonyl.”

For *claim 70*, MacDonald et al teaches the removal of the t-BOC protecting groups (see MacDonald et al, page 152, column 2, last paragraph), which reads on the preamble of claim 70 wherein a protective group is “removed” from a synthetic intermediate. Furthermore, MacDonald et al teaches that the protecting group can be removed from a “synthetic intermediate” on a “surface” (see MacDonald et al, page 152,

column 2, last paragraph; page 153, column 1, figure 2) (disclosing a poly[4-(terbutoxycarbonyl) poly-carbonate-oxy]styrene layer, which is a “synthesis intermediate” having a protecting t-BOC group, and a lithographic surface for making a semiconductor device), which also reads on the preamble and part a) of claim 70. In addition, MacDonald et al discloses triphenylsulfonium hexafluoroantimonate (acts as a radiation sensitive compound) to generate in the presence of light trifluoromethane sulfonic acid (acts as a catalyst) which can cleave the t-BOC protecting group and can also cleave more triphenylsulfonium hexfluoroantimonate (acts as an autocatalytic compound) i.e., triphenylsulfonium hexfluoroantimonate functions as both a radiation sensitive compound **and** an autocatalytic compound (see MacDonald et al, page 152, last paragraph to page 153, first column), which reads on parts i) and ii) of claim 70. Finally, MacDonald et al teaches “light-directed, spatially-addressable techniques” for removing protecting groups (see MacDonald et al, page 153, figure 2) (showing the use of a mask to direct the light catalyzed hydrolysis of the t-BOC).

For **claim 71**, MacDonald et al teaches triphenylsulfonium hexafluoroantimonate that is converted via light to trifluoromethane sulfonic acid, which reads on claim 72 wherein “said photosensitive compound is ... a photoactivated acid catalyst.”

For **claim 72**, MacDonald et al teaches a poly[4-(terbutoxycarbonyl) poly-carbonate-oxy]styrene which possesses a “phenol linker” to the backbone (see MacDonald et al, Figure 3), which reads on claim 72 wherein the synthesis intermediate is a “linker” molecule.

For *claim 76*, MacDonald et al teaches the t-BOC protecting group (see MacDonald et al, page 152, second column), which reads on claim 60 wherein “the protecting group is selected from ... tert-butyloxycarbonyl.”

Response

Applicant's arguments directed to the above anticipation rejections over the Holmes et al and MacDonald et al were considered but not found persuasive for the reasons outlined below. Please note that the original rejections have been modified to more clearly address applicants' amendments and/or arguments.

For Holmes et al, applicants argue that [a] “although the rejection based on the two Holmes references is identified as being under § 203(b), applicants respectfully believe this citation to be in error as the substance and meaning of the Examiner's rejection seems to be one of obviousness. Accordingly, applicants are responding to the rejection as if is one under § 103”, [b] “As amended, Applicants' claims are directed to a method of removing a protecting group from a reactive functional group to make the reactive functional group available for reaction with a synthesis intermediate. The Examiners primary reference, the Holmes '974 patent, fails to teach or suggest the removal of a protecting group from a reactive functional group to make the reactive functional group available for reaction with a synthesis intermediate or the use of an autocatalytic group to remove a protecting group. Instead, the Holmes '974 patent teaches a method for cyclization and reversal of the polarity of polymers on a substrate.”, [c] the Holmes '773 patent teaches linking groups useful in solid phase synthesis. The Holmes '773 patent does not teach or suggest the forming of a surface using an autocatalytic compound. Applicants

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submit that the Holmes '773 patent does not fairly teach at col. 18, lines 43-54 that NVOC is a radiation sensitive compound and a catalyst. In fact, the Holmes '773 patent teaches that the 6,6-azobisveratric acid produced upon light activation of the NVOC group is undesirable and they provide procedures for removal of the species", [d] "there is no motivation to combine or to modify the Holmes '974 patent with the Holmes '773 patent in the manner suggested by the Examiner because the Holmes '773 patent teaches the undesirability and removal of the NOVC species. Accordingly, the Holmes '773 patent fails to cure the deficiency of the Holmes '974 reference", [e] "Thus, the combination of the two Holmes references do not teach or suggest applicants' invention, and applicants respectfully request withdrawal of the obviousness rejection."

The Examiner's position is that [a] this is not a §103 rejection, but a §102 rejection as previously stated in the outstanding rejection. The Examiner may provide a second reference for the sole purpose of showing inherency of an element in an anticipatory reference, as is the case here. See MPEP § 2131.01. The Examiner stated clearly in the outstanding rejection (see above) "Holmes, C. P. ['773] discloses the inherent properties of the NVOC protecting group" (emphasis added on the word "inherent" as done previously by the Examiner in the outstanding rejection via underlining the word) i.e., the reference is only being provided to show an inherent property of the NVOC group, [b] applicants claims are NOT directed solely to a method of removing a protecting group from a reactive functional group to make the reactive functional group available for reaction with a "synthesis intermediate" as claimed by applicants because the claims recite "synthesis intermediate or other compound" wherein the "other compound" would not be limited to a "synthesis intermediate." Furthermore, applicants claims do not say

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that the reactive functional group reacts with a synthesis intermediate or other compound, but only that they are “available” to react. The Examiner contends that any reactive functional group would be “available” to react including the reactive functional groups outlined in the outstanding rejection (see also the new 35 USC § 112, second paragraph rejections below). Furthermore, Holmes et al does teach the removal of NVOC (i.e., a protecting group) via exposure to light that is autocatalytic (i.e., the ‘773 shows that this is an inherent property of the NVOC group) that will make a reactive functional group that will react with monomers, which are compounds and/or synthetic intermediates (see ‘974, figure 5, reaction of NVOC with $h\nu$ and monomers). Furthermore, applicants admit that the NVOC can be used for cyclization and reversal of the polarity of polymers and both of these reactions would constitute the reaction of a synthetic intermediate and/or compound with a reactive functional group i.e., nothing in the claim states that the synthetic intermediate and/or compound cannot be another part of the compound that contains the reactive functional group, [c-e] The Examiner does not have to show “motivation” to combine the ‘974 patent with the ‘773 patents because a 35 USC § 103 rejection is not being made (see section [a] above). Furthermore, the Examiner is not relying on the ‘773 patent to show anything other than the inherent properties of the NVOC protecting group and, as a result, any alleged deficiencies in the ‘773 patent are not being relied upon in the outstanding 35 USC § 102 (b) rejection. All of the claimed limitations are fully anticipated by the ‘974 rejection alone. The ‘773 patent is only used here to show the inherent properties of the NVOC protecting group (see above).

For MacDonald et al, applicants argue “MacDonald is directed to a photolithographic process and fails to teach the limitation of making a reactive functional group available for

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reaction with a synthesis intermediate. MacDonald, in fact, teaches the removal of the entire “surface” of a polymeric photoresist layer when it is exposed to UV light. There is no teaching or suggestion in MacDonald that any reactive functional group is present on the substrate surface when the resist layer is removed. This is in direct contrast to the method taught in the instant application, wherein a protecting group is removed to reveal a reactive functional group for later reaction with a synthesis intermediate or other compound. For example, see page 152, second column, where “reducing the resist file thickness in the exposed areas ...” is taught.

The Examiner’s position is that MacDonald does not fail to teach the limitation of making a reactive functional group available for reaction with a synthesis intermediate or other compound. The phenol produced by the acid-catalyzed decomposition of *tert*-butyl carbonate can be reacted with another compound i.e., $\text{Me}_2\text{N-SiMe}_3$ to produce poly-SiMe₃ (see MacDonald et al, page 157, figure 11), which still anticipates applicants claimed invention. Furthermore, even if MacDonald didn’t show an actual reaction between the phenol group and “another compound”, it would still anticipate the reference because applicants’ amended claims only state that the functional group has to be made “available” to react with a synthesis intermediate or other compound and clearly the phenol group is “available” to react with the $\text{Me}_2\text{N-SiMe}_3$ in this case or any other compound for that matter. Therefore, the Examiner does not agree with applicants’ assertions (see above) and, as a result, the rejection is maintained.

New Rejections

Claims Rejections - 35 U.S.C. 112, first paragraph

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

8. Claims 1-3, 6, 12, 14-15, 52-60 and 70-76 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed had possession of the claimed invention. This is a new matter rejection.

A. In newly amended claim 1, to the extent that the phrase “a method for removing a protecting group from a reactive functional group” extends beyond the original phrase “a method for removing a protective group from a synthesis intermediate” (e.g., the method is no longer confined to a synthesis intermediate), the increased breadth of possible modification constitutes new matter, since there is no specification support or original claim support for such scope; nor has applicant provided any indication where such support exists (please note that the specification on page 4, lines 10-12 does not provide support for this increased breadth).

9. Claims 1-3, 6, 12, 14-15, 52-60 and 70-76 are rejected under 35 USC 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Applicant is directed to the

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Guidelines for the Examination of Patent Applications Under the 35 USC 112, ¶ 1 “Written Description” Requirement, Federal Register, Vol. 66, No. 4 pages 1099-1111, Friday January 5, 2001. This is a written description rejection.

To satisfy the written description requirement, an applicant must convey with reasonable clarity to those skilled in the art that, as of the filing date sought, he or she was in possession of the invention. Applicants’ claims are directed to “reactive functional groups.” The “reactive functional groups” are defined only by their function i.e., that they are “reactive”, without providing any structural attributes for the functional groups. This terminology encompasses an enormous variety of different chemical entities of widely varying chemical structure. See also rejection under 35 USC 112, second paragraph below.

The language of the specification should describe the claimed invention so that one skilled in the art can recognize what is claimed. A description of a compound in terms of its function (i.e., that it is reactive) fails to distinguish the compound from others compounds. A description of what a material does, rather than of what it is, usually does not suffice. The disclosure must allow one skilled in the art to visualize or recognize the identity of the subject matter purportedly described. *University of California v. Eli Lilly and Co.* (U.S. Court of Appeals Federal Circuit (CAFC) 43 USPQ2d 1398 7/22/1997 Decided July 22, 1997; No. 96-1175).

The specification discloses only limited examples of reactive functional groups. Consequently, Applicants’ claimed scope represents only an invitation to experiment regarding possible functional groups that might be reactive. The disclosure is neither representative of the claimed genus, nor does it represent a substantial portion of the claimed genus. Moreover, the

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claimed genus encompasses members, which are yet to be prepared or envisioned. This further evidences that instant disclosure does not constitute support for the claimed genus or a substantial portion thereof.

Claims Rejections - 35 U.S.C. 112, second paragraph

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. Claims 1-3, 6, 12, 14-15, 52-60 and 70-76 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

A. For **claim 1**, the phrase “making the reactive functional group available for reaction with a synthesis intermediate or other compound” is vague and indefinite. For example, it is not clear what conditions would be required to make all reactive functional groups available for reaction with a synthesis intermediate or other compound? Furthermore, if the functional group is a “reactive” functional group wouldn’t it already be “available” for reaction with a synthesis intermediate or other compound. If not, under what conditions would the reactive functional group not be “available” to react? It is the Examiner’s position that all functional reactive groups would be able to react with a synthesis intermediate or other compound and, as a result, it is not clear how this limitation (i.e., the availability to react) further limits the reactive functional group.

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Consequently, the metes and bounds of the claimed invention cannot be determined.

Therefore, claims 1 and all dependent claims are rejected under 35 U.S.C. 112, second paragraph.

B. For **claim 1**, the phrase “reactive functional group” is vague and indefinite. For example, it is not clear how a person of skill in the art could determine which functional groups were “reactive” from those that were not without a specific teaching of the compounds or synthetic intermediates that were being reacted with the functional groups.

Consequently, the metes and bounds of the claimed invention cannot be determined.

Therefore, claims 1 and all dependent claims are rejected under 35 U.S.C. 112, second paragraph.

Conclusion

Applicant's amendment necessitated any new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

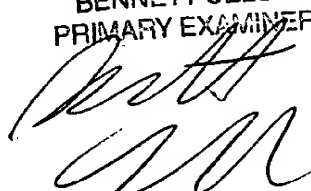
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41. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jon D. Epperson, Ph.D. whose telephone number is (703) 308-2423. The examiner can normally be reached on Monday-Thursday from 9:30 to 7:00 and alternate Fridays.

42. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrew Wang, can be reached on (703) 306-3217. The fax phone number for the organization where this application or proceeding is assigned is (703) 308-4242. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0196.

Jon D. Epperson, Ph.D.
April 12, 2003

BENNETT CELSA
PRIMARY EXAMINER

A handwritten signature in black ink, appearing to read 'Bennett Celsa', is written over the printed name and title.